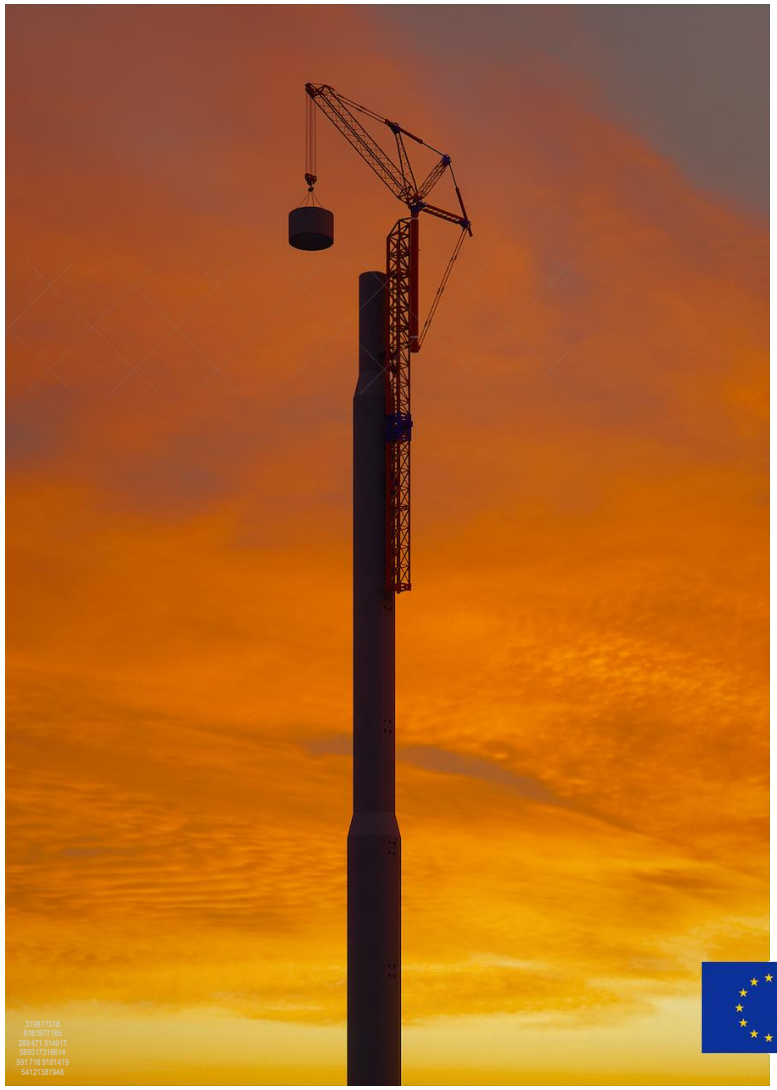


HWS
Let's Build Smarter

PRESENTACION GENERAL

Nuevas SOLUCIONES
con hormigón PREFABRICADO y PRETENSADO
para el sector de la ENERGIA EOLICA

M.Abadía

CICCP Euskadi, Bilbao, 3 Febrero de 2023

This Project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement
No. 804858 H2020-SMI Instrument Phase 2

The HWSôFounders and current Partners

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ingzero

Estructural Engineering

(12 Estructural Eng.)

https://ingzero.com

HWS ENGINEERING



Precast Designer & Contractor



Contractor



Wind Industry

azagra PATENTES Y MARCAS

IP Specialized Lawyers

(6 Lawyers)

http://www.azagra.biz/

Turbina Eólica = Estructura entre TORRE COMUNICACIONES y DEPOSITO DE A
+ cargas cíclicas, muy repetidas de periodo ñcortoò

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➜Turbinas ONshore:

Combinaciones de Cargas para DISEÑO, mucho más complicadas que en estructuras para O.P. o edificación.

En algunos países se añade SISMO (+Licuefacción) y TIFON.

➜En OFFshore flotante, ñsueloò también vibrante.



Partes de Hormigón:

CIMIENTOS + TORRES:

ÅFATIGA, a niveles no conocidos hasta ahora en el hormigón.

ÅRIGIDEZ ROTACIONAL del conjunto turbina, y cada vez más incluyendo el suelo.

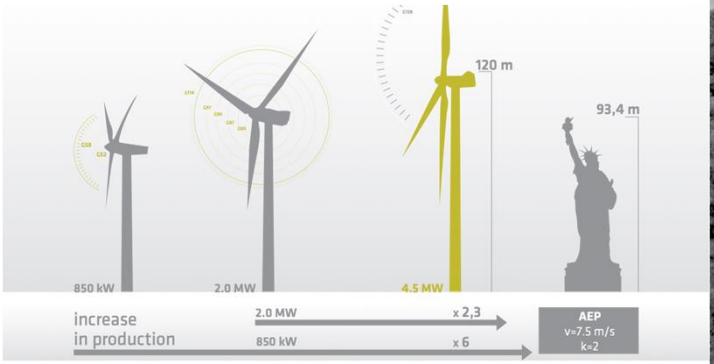


⇒ Modelos MEF muy

Turbinas actuales de Siemens-Gamesa

Turbine	Rotor	Tower	Link
SG 5.0-145	145 m	90, 102.5, 127,5 m HH	Link to Brochure
SG 5.8-155	155 m	90, 102.5, 122.5, 165 m HH	Link to Brochure
SG 6.6-170	170 m	100, 115, 135, 145, 150, 165 m HH	Link to Brochure
SG 7.0-170	170 m	Torre 165 m + Pala 83 m = 238 m (*)	







(*) Torre IBERDROLA, Bilbao, 165 m / ESPACIO, Madrid, 234 m



≃17.500 towers of 4.5 MW in next 10 years.
Currently 90% of steel + 10% of concreteé

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é but STEEL is arriving to dynamic/structural boundaries,
so new concepts are appearing: Cost-Effectiveness?





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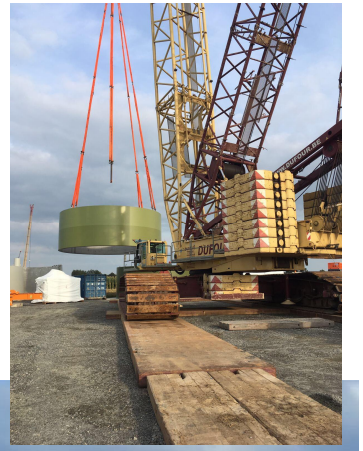
ENERCON (DE) and MAX-BÖGL (DE) towers:

A: SHORT parts or ñtrucksòconcept.



Multiple å3.6 m height cone-trunks, weight up to 70 t.







Along last years, concepts A and B are getting closer é being currently similar.



NORDEX Group (ES+DE), the ACCIONA Concrete Tower:

B: LONG parts or ñtilesòconcept.

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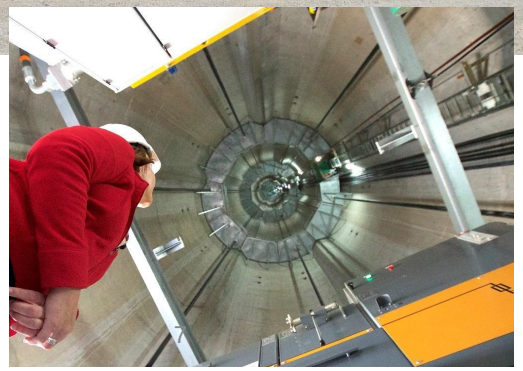
➜ 120 m HH tower, Full-C.

➜ +20 parts-ñtilesò, weight up to 60 t.

➜ When assembled, 6x cylinders, 20 m height, weight up to 230









AirTOWER v1: Patented 2005, Installed 2008-2012.

airtower v1 HWS Let's Build Smarter



Gamesa

Power of the wind turbine	4.5 Mw (4,500 Kw)	
Weight of the wind turbine	75 t	82.7 ton
Length of each blade	60 m	196 ft.
Surface covered by the blades	11,690 m^2	126,000 sqf.
Total height of tower	**120 m**	**395 ft.**
Height of the steel tube	38 m	125 ft.
Height of the concrete tube	82 m	270 ft.
Top diameter of concrete tube	4.5 m	14 ft. 9 in.
Base diameter	8.5 m	27 ft. 11 in.

AirTOWER v1:

120m high, ñhybridò 80+40 m

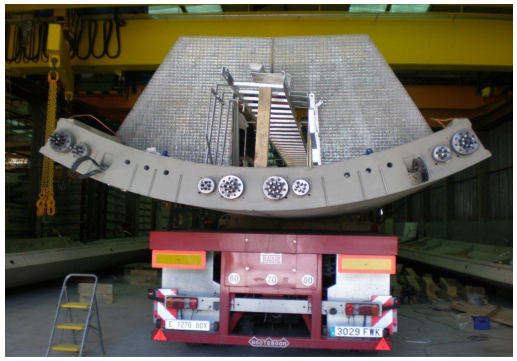
The 2005/08 DESIGN and PATENT. 9 units up to 2012.

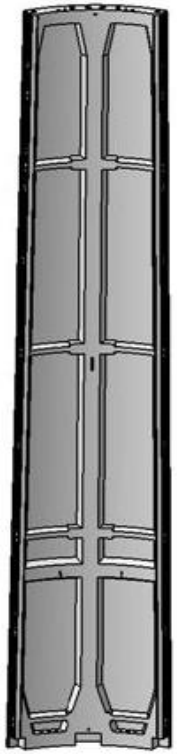


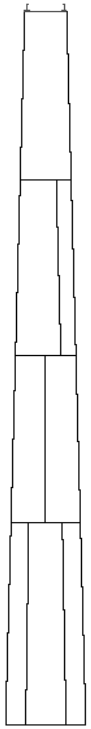
GAMESA G10ôConcrete-Hybrid Tower (2005, 08, 12)

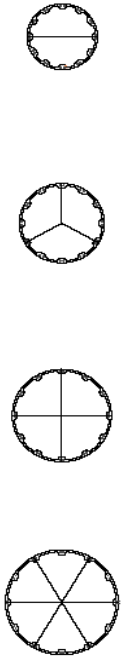
airtower V1 HWS Let's Build Smarter

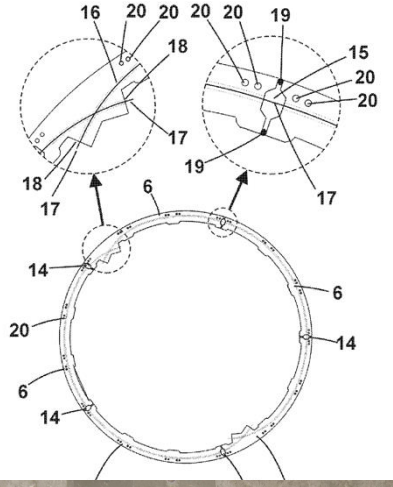


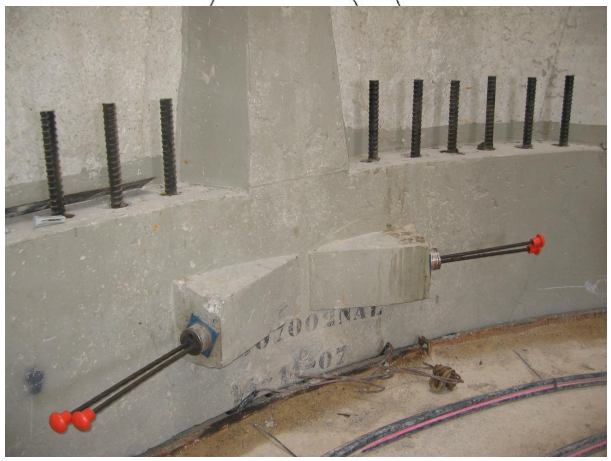












Gamesa

GAMESA G10ôConcrete-Hybrid Tower (2005)

airtower v1 HWS Let's Build Smarter



HWSôSOLUTIONS to MARKET NEEDS

11 Patents, 6 active (ñcommercialò) → 5 Products/Solutions + Special Eng.Services

airtower SUPERTALL

220 m and beyond cost-efficiently

aircrane

This Project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 804658 H2020-SPIRE-2018 Instrument Phase 2

TÜVRheinland

airtstar* by ingero

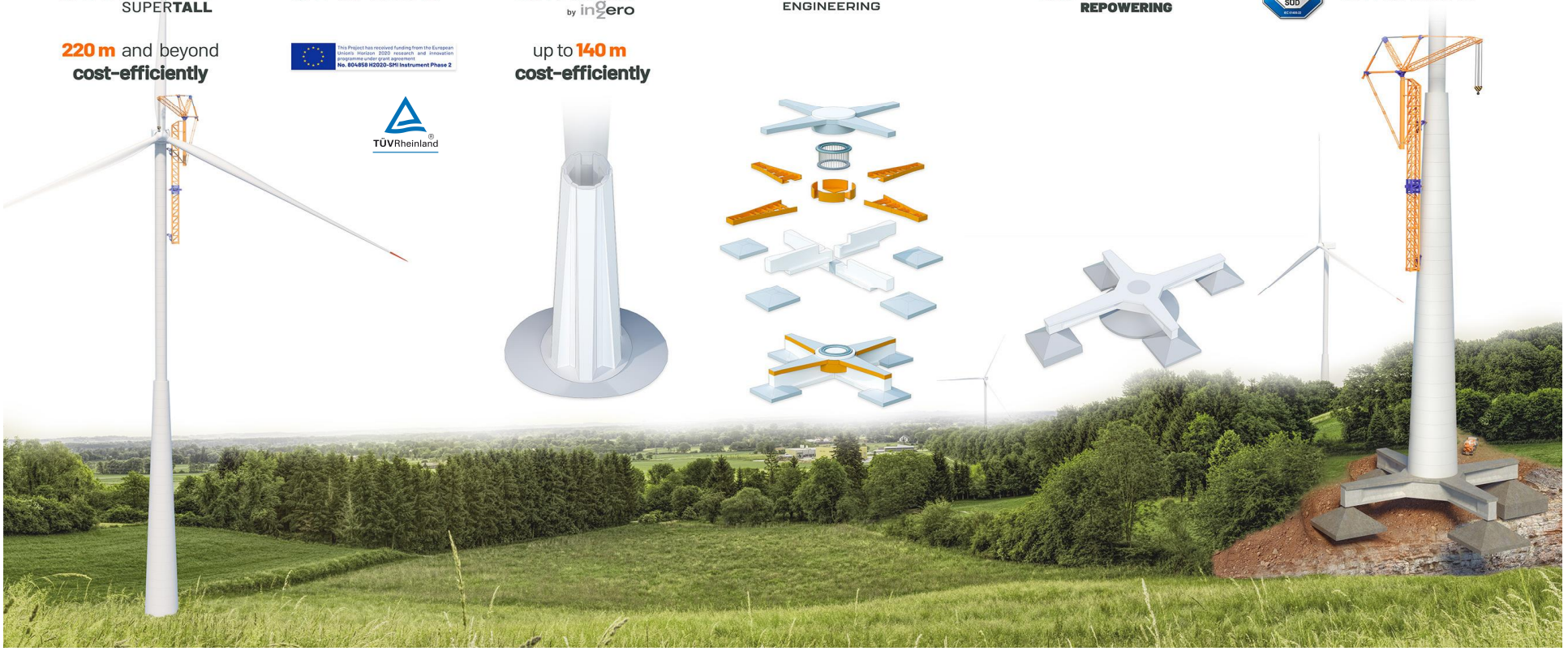
up to 140 m cost-efficiently

HWS ENGINEERING

airbase+ REPOWERING

TÜV SÜD

airbase+

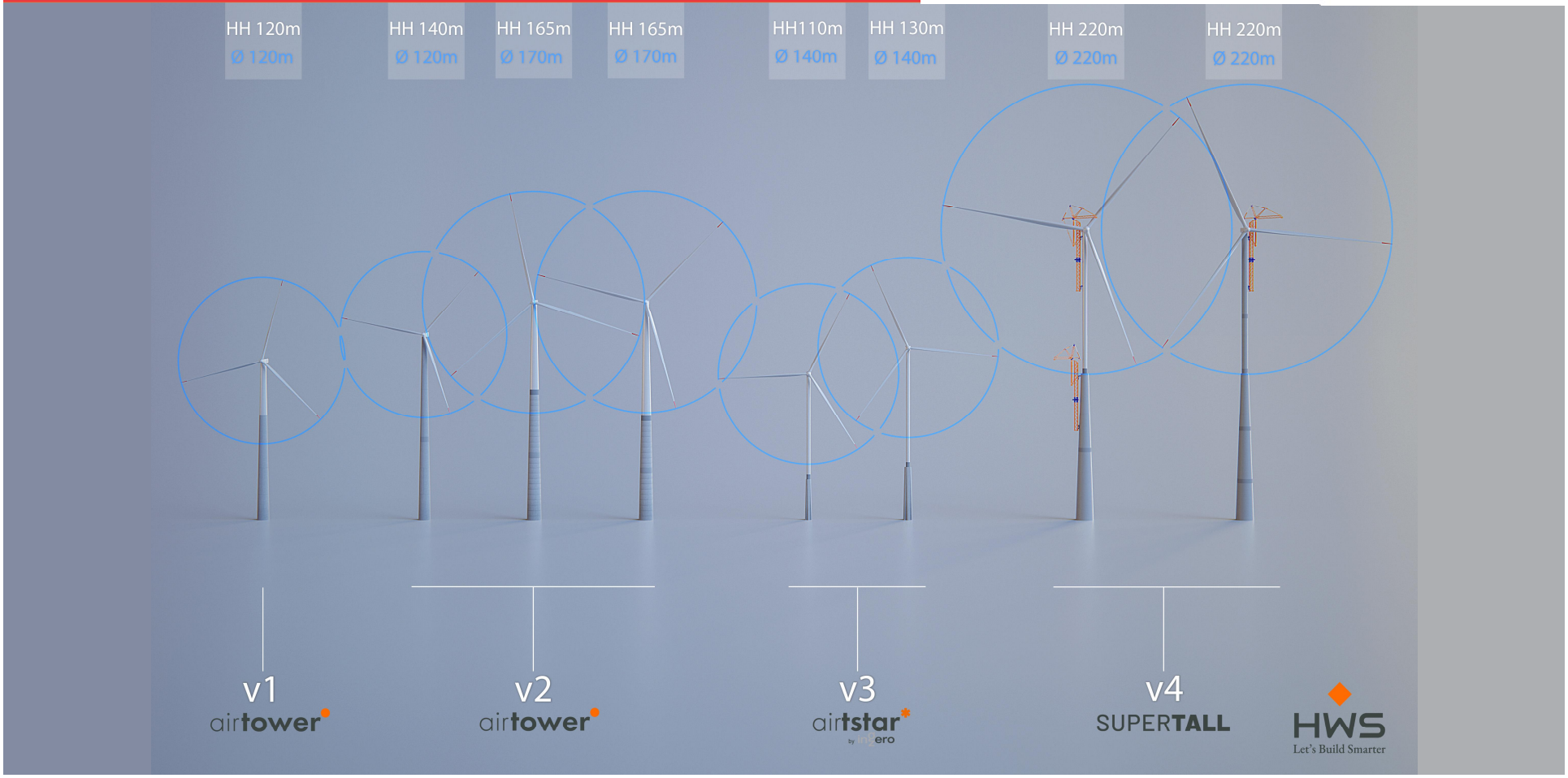


HWS Let's Build Smarter

HWSôSOLUTIONS to MARKET NEEDS

airtower

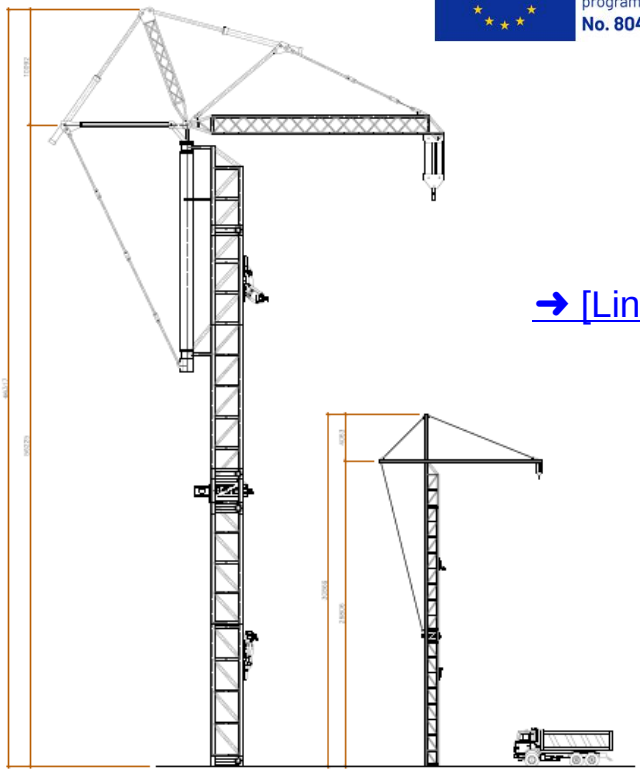
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Comparing AirCRANE System 165 t and 30 t



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➜ [Link to Vimeo VIDEO]

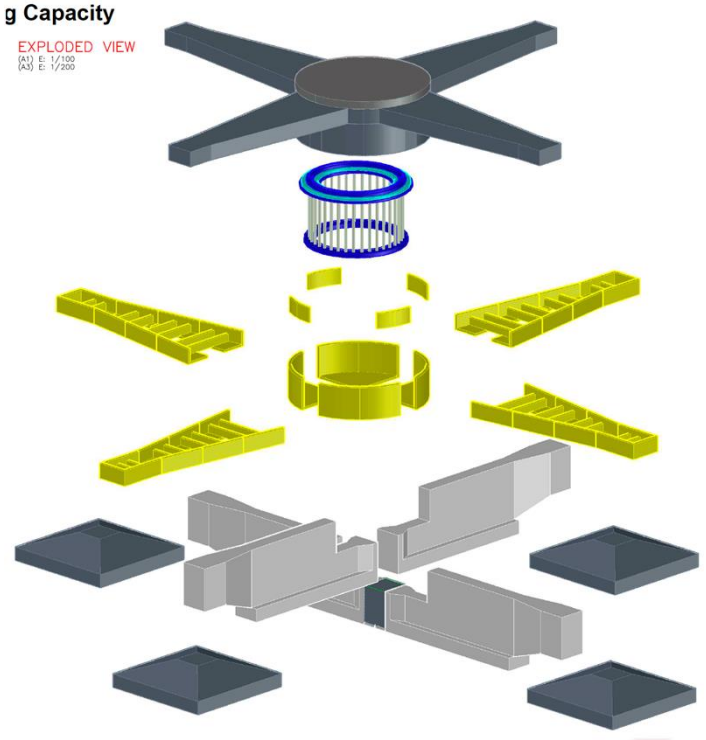
AirCRANE 165 t
Installation

AirCRANE 30 t
Maintenance

AirBASE precast solution

4 isolated footings + 4 precast girders forming a cross shape structure





ñHWSÒ*arget:*
Seeking simple and quick construction site works, ***supported by*** *Industrialized Production and smart Designsò*



thanks!

Let's Build Smarter

www.hwstowers.com

airbase aircrane airtower airjoint

The Experts in Precast Concrete.